

METHOD AND APPARATUS FOR DYNAMICALLY ADJUSTING THE AGGRESSIVENESS OF AN EXECUTE-AHEAD PROCESSOR

ABSTRACT

One embodiment of the present invention provides a system that dynamically adjusts the aggressiveness of an execute-ahead processor. If a data-dependent stall condition is encountered during program execution, the system enters an execute-ahead mode, wherein instructions that cannot be executed because of the unresolved data dependency are deferred, and other non-deferred instructions are executed in program order. If a non-data-dependent stall condition is encountered during execute-ahead mode, the system enters a scout mode, wherein instructions are speculatively executed to prefetch future loads, but results are not committed to the architectural state of the execute-ahead processor. On the other hand, if an unresolved data dependency is resolved during the execute-ahead mode, enters a deferred mode and executes deferred instructions. During this deferred mode, if some instructions are deferred again, the system determines whether to resume execution in the execute-ahead mode. If it determines to do so, the system resumes execution in the execute-ahead mode, and otherwise resumes execution in a non-aggressive mode.